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CISCO SYSTEMS

Installing the High-Density V.35 Applique and Interface Cable

Product Numbers: APP-JX1, APP-LX2, APP-LX4, APP-LX6, APP-LX8, APP-IX1, APP-SX2, APP-SX4, APP-SX2E2, CAB-VTM, CAB-VTF, CAB-VCM, and CAB-VCF

Description of Part

The term *applique* is used for any hardware unit that provides the external interface connections from your router to the network. An applique includes connector mounting hardware, a connector port, and a printed circuit card that translates communications signals from and into the specified electrical attachment.

This document contains instructions for installing the high-density (HD) V.35 applique (see Figure 1). This applique is dual-mode and functions as either a data terminal equipment (DTE) interface or a data communications equipment (DCE) interface, depending upon which of the HD V.35 cables you use for the network interface.

Four HD V.35 cables are available: DTE male to male (CAB-VTM), DTE male to female (CAB-VTF), DCE male to male (CAB-VCM), DCE male to female (CAB-VCF). You must use one of these cables with the HD V.35 applique.

The HD V.35 applique connects to the serial communications interface (SCI) card (providing up to four serial ports) or to a multiport communications interface (MCI) card (providing up to two serial ports).

The HD V.35 applique is mounted on a connector plate (see Figure 1) that attaches to the rear of the chassis. Three connector plate sizes are available: large (L), small (S), and individual (I). An example of the large and individual connector plates is shown in Figure 2. The small connector plate, used in the M chassis, is not shown. An internal ribbon cable connects the applique to the serial network interface card in the chassis card cage; one of these cables is used for every two appliques installed.

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Figure 1 shows the HD V.35 applique.

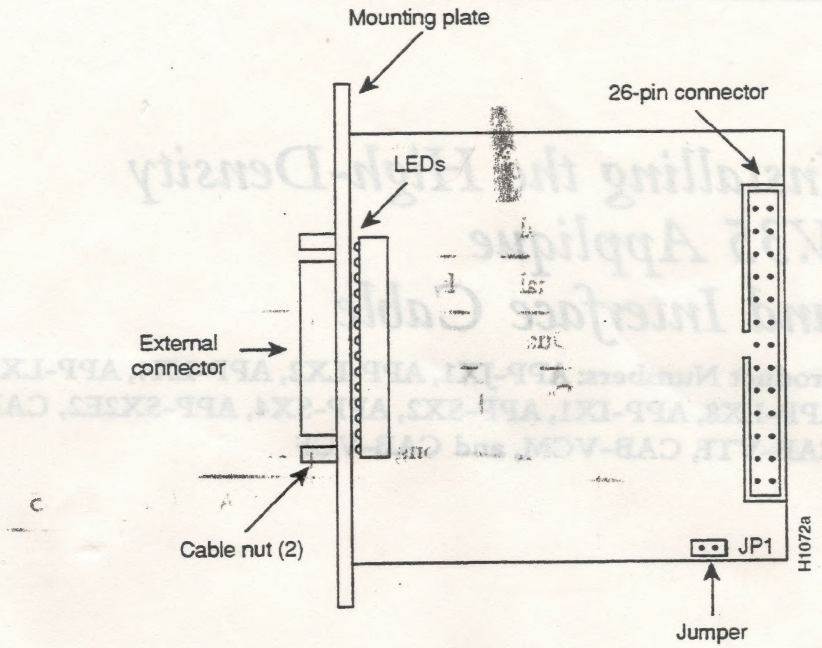

Figure 1 HD V.35 Applique—Component Side View

Figure 2 shows the small and large connector plates used with the HD V.35 applique.

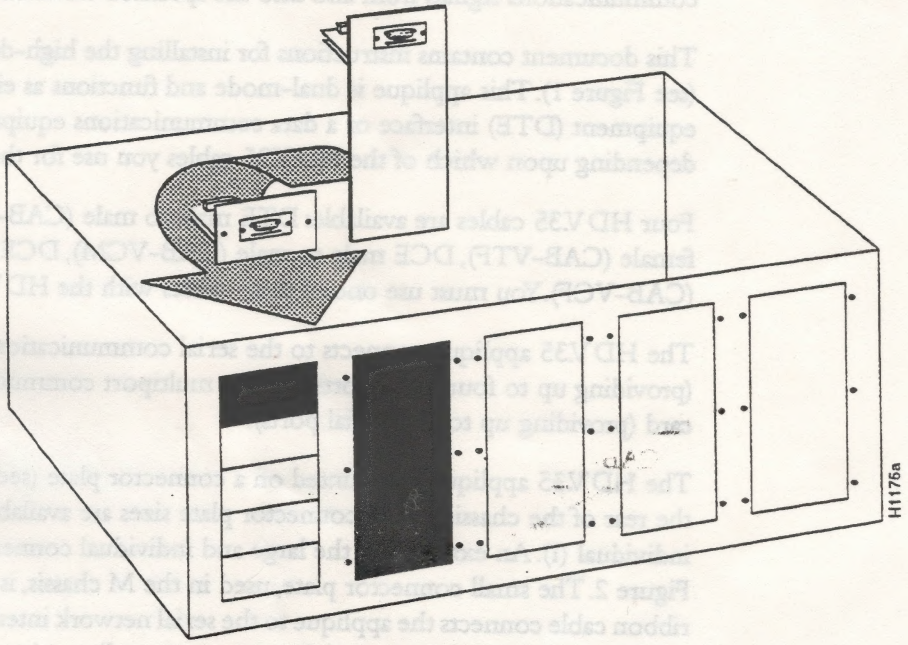

Figure 2 HD V.35 Appliques on Individual and Large Connector Plates

The HD V.35 applique and external interface cable options are listed by product number in Table 1 and Table 2.

Table 1 HD V.35 Appliques by Product Number

Product Number	Mode	Plate Size	Chassis	Number of Interfaces
APP-IX1[a]	Dual	Individual	M, C	1 HD V.35
APP-JX1	Dual	Individual	A+, A	1 HD V.35
APP-LX2	Dual	Long	A+, A	2 HD V.35
APP-LX4	Dual	Long	A+, A	4 HD V.35
APP-LX6	Dual	Long	A+, A	6 HD V.35
APP-LX8	Dual	Long	A+, A	8 HD V.35
APP-SX2	Dual	Small	M, C	2 HD V.35
APP-SX4	Dual	Small	M, C	4 HD V.35
APP-SX2E2	Dual	Small	M, C	2 HD V.35 and 2 Ethernet

a. X = HD V.35

Note: If an individual HD V.35 applique is ordered, the product number APP-IX1 is used (X = HD V.35).

Table 2 HD V.35 External Interface Cables by Product Number

Product Number	Mode[a]	Cable Gender
CAB-VTM	DTE	Male-to-male
CAB-VTF	DTE	Male-to-female
CAB-VCM	DCE	Male-to-male
CAB-VCF	DCE	Male-to-female

a. Each applique is shipped with the appropriate interface cable depending upon the desired mode of the applique (DTE or DCE) and the cable gender required.

Configuring the HD V.35 Applique

The HD V.35 applique carries the same signals as the old-style V.35 applique, but provides them on a smaller 26-pin D-type connector (the old-style applique used a 34-pin connector). The smaller 26-pin connector is male on all four versions of the HD V.35 cable and the larger connector on each cable carries the male or female configuration. The HD V.35 supports both DTE and DCE modes; the external V.35 cable attached to the applique determines this mode. You must use an HD V.35 cable to provide a standard V.35 network connection.

Table 3 provides pinouts for the HD V.35 applique (and cable) when used as a DTE or DCE interface.

Table 3 HD V.35 Dual-Mode Applique and Cable Pinout

Applique		Cable			
DTE Pin	DCE Pin	Pin	Signal	Function	Direction
26	26	A	FG	Frame Ground	—
17	17	B	SG	Signal Ground	—
23	24	C	RTS	Request to Send	To modem
24	23	D	CTS	Clear to Send	To chassis
22	25	E	DSR	Data Set Ready	To chassis
20	19	F	RLSD	Receive Line Signal Detect (Carrier Detect)	To chassis
19	20	H	DTR	Data Terminal Ready	To modem
21	22	K	LT	Local Test (Loopback)	To modem
2	4	R	RD+	Receive Data+	To chassis
12	14	T	RD-	Receive Data-	To chassis
6	5	V	SCR+	Serial Clock Receive+	To chassis
16	15	X	SCR-	Serial Clock Receive-	To chassis
4	2	P	SD+	Send Data+	To modem
14	12	S	SD-	Send Data-	To modem
5	6	U	SCTE+	Serial Clock Transmit External+	To modem
15	16	W	SCTE-	Serial Clock Transmit External-	To modem
1	3	Y	SCT+	Serial Clock Transmit+	To chassis
11	13	a	SCT-	Serial Clock Transmit-	To chassis
	9[a]	—	DCE/DTE	Selects DCE mode	—
	18	—	DCE/DTE	Selects DCE mode	—

a. Pins 9 and 18 are tied together to force the applique into DCE mode when the DTE/DCE jumper on the MCI or SCI card is set for DCE and the appropriate HD V.35 cable is used.

HD V.35 Jumper Settings

When operating at speeds above 300000 bps, the serial clock transmit external (SCTE) signal becomes especially important. The HD V.35 applique returns Transmit Clock on SCTE. This is designed to compensate for clock phase shift on long cables. The HD V.35 modem *must* be configured to accept SCTE.

With the HD V.35 applique in DCE mode, the applique can be configured to use either SCTE or serial clock transmit (SCT). The default is SCTE, which is selected when the JP1 jumper is in; SCT is selected when the JP1 jumper is out (see Figure 1).

HD V.35 LEDs

Table 4 shows the 14 LEDs that indicate the status of the HD V.35 applique.

Table 4 HD V.35 Applique LEDs

Mnemonic	LED Color	Signal Name	Direction
TXD	Red	Transmit Data	To chassis
SCTE	Red	Transmit Clock Echo	To chassis
RXD	Red	Receive Data	From chassis
RXC	Red	Receive Clock	From chassis
RLSD	Red	Receive Line Signal Detect	From chassis
CTS	Red	Clear to Send	From chassis
RTS	Red	Request to Send	To chassis
DTR	Red	Data Terminal Ready	To chassis
LT	Red	Software Loopback	To chassis
+5V	Green	+5 V present	–
+12V	Green	+12 V present	–
-12V	Green	-12 V present	–
OK	Green	Applique test okay	–
DCE	Red	On for DCE mode	–

Note: Depending upon the chassis space available and the position of the applique, the LED pattern orientation may begin from the top, bottom, left, or right. In every case, use the green LEDs and the single red LED (toward the end of the row) for the correct pattern orientation.

Configuring the Serial Interface

Following are the procedures for configuring the serial interface.

Changing the Clock Source and Rates (DCE Mode Only)

For DCE operation, you must configure the clock rate on the serial interface of the MCI or SCI card using the **clockrate** *speed* interface subcommand (where *speed* is the bit rate of the interface in bits per second [bps]). The applique must be configured as DCE (using the appropriate HD V.35 cable) to generate the clock signals.

Enter the **clockrate** *speed* command (for each interface used in DCE mode) in the configuration command collection mode, and write this to memory (using the **write memory** command).

Following is sample output of these commands:

```
Router#configure terminal
Enter configuration commands, one per line.
Edit with DELETE, CRTL/W, and CRTL/U;end with CTRL/Z
interface serial 0
clockrate 64000
^Z
Router#write memory
[ok]
Router#
```

Note: The **no clockrate** command removes the clock rate if DTE mode is desired.

Refer to the *Router Products Configuration and Reference* publication for more information about the configuration command collection mode.

Following are the acceptable clock rate settings in bits per second (bps):

1200, 2400, 4800, 9600, 19200, 34800, 56000, 64000, 72000, 125000, 148000, 500000, 800000, 1000000, 1300000, 2000000, and 4000000.

Note: The fastest speeds may not work if your cable is too long; however, all of the speeds listed above are supported by the HD V.35 cables.

Setting the Serial Port Mode (DTE or DCE)

Jumper settings on the interface card (SCI or MCI) determine the mode (DTE or DCE) of the serial port connected to your applique. The cards are shipped with the jumpers in DTE mode as a default (see Figure 3). On the SCI card, assign a serial port as DCE by changing the jumper as described in Table 5.

Table 5 SCI Jumper Settings for DCE Serial Ports

Move Jumper	For Serial Port
N24 to N22	serial 0 as DCE
N28 to N26	serial 1 as DCE
N14 to N12	serial 2 as DCE
N18 to N16	serial 3 as DCE

Note: The jumper positions relative to the port positions on the card appear crossed.

Figure 3 shows the default jumper settings on the CSC-MCI card.

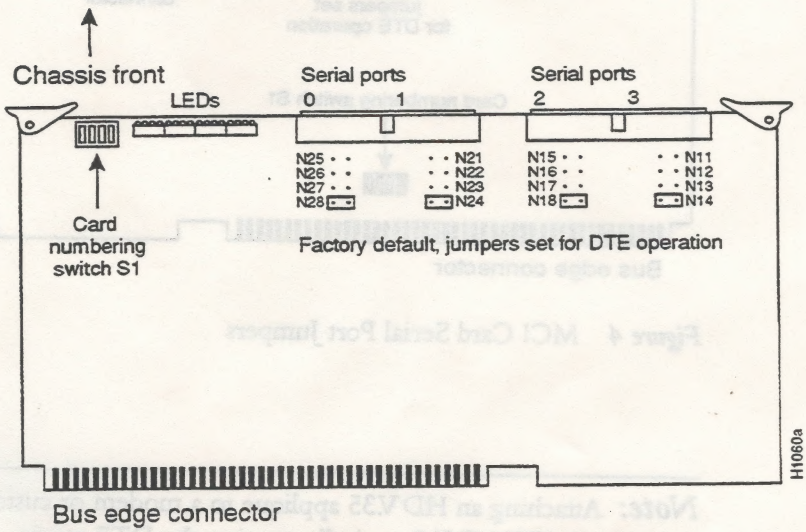

Figure 3 SCI Card Serial Port Jumpers

Note: Attaching an HD V.35 applique to a modem or customer service unit/data service unit (CSU/DSU) typically requires the DTE mode.

On the MCI card (see Figure 4), assign a serial port as DCE by changing a jumper as described in Table 6.

Table 6 MCI Jumper Settings for DCE Serial Ports

Move Jumper	For Serial Port
W53 to W51	serial 0 as DCE
W43 to W41	serial 1 as DCE

Note: The jumper positions relative to the port positions on the card appear crossed.

Figure 4 shows the default jumper settings on the CSC-MCI card.

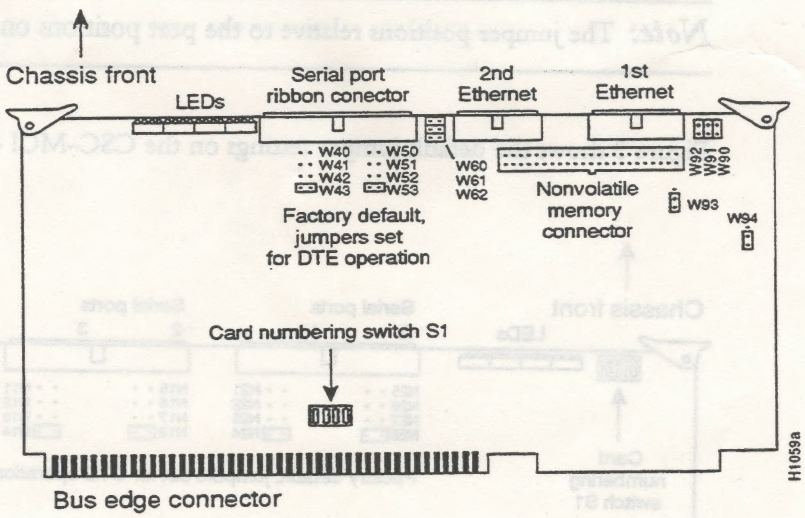

Figure 4 MCI Card Serial Port Jumpers

Note: Attaching an HD V.35 applique to a modem or customer service unit/data service unit (CSU/DSU) typically requires the DTE mode.

Installation Procedures

Following are the procedures for installing the HDV.35 applique.

Installation Prerequisites

Before installing the applique, ensure that your system meets the following prerequisites.If your current configuration does not meet the above requirements, contact your service representative for information on hardware and software upgrades.

You must have an HDV.35 cable of the correct gender for the mode you are using (DTE or DCE)

- Your system must contain an MCI card with microcode version 1.5 or later or an SCI card with microcode version 1.2 or later.
- The interface card must have one configured serial port available for each applique to be installed

Required Parts and Tools

Following are the parts required for these procedures. If any of these parts are missing or appear damaged, contact your service representative.

- HDV.35 applique with attached connector plate
- One of the following four HDV.35 cables for each applique to be installed: CAB-VTM, CAB-VTF, CAB-VCM, or CAB-VCF (see Table 2)

Note: One of these cables is included with each applique shipped. The type of cable shipped is based upon what applique mode was ordered and your site requirements.

- Ribbon cable for the internal connection between the applique and the serial interface card (one ribbon cable for every two appliques)
- ESD prevention wrist strap (disposable wrist strap is included with the applique to prevent damage to equipment from electrostatic discharge)

Following are the tools required for these procedures:

- Two Phillips screwdrivers: sizes No.1 and No. 2
- One medium flat-blade screwdriver and one 3/16" nut driver

Preventing Electrostatic Discharge (ESD) Damage

Electrostatic discharge damage (ESD) occurs when electronic printed circuit cards are improperly handled and can result in complete or intermittent failures. ESD can impair electronic circuitry and equipment. Follow ESD prevention procedures when removing and replacing cards.

Following are steps for handling printed circuit cards:

Step 1: Slip on an ESD wrist strap, ensuring that it makes good skin contact.

Step 2: Connect the strap to an unpainted chassis frame surface or another proper grounding point or surface to safely channel unwanted ESD voltages to ground (see Figure 5).

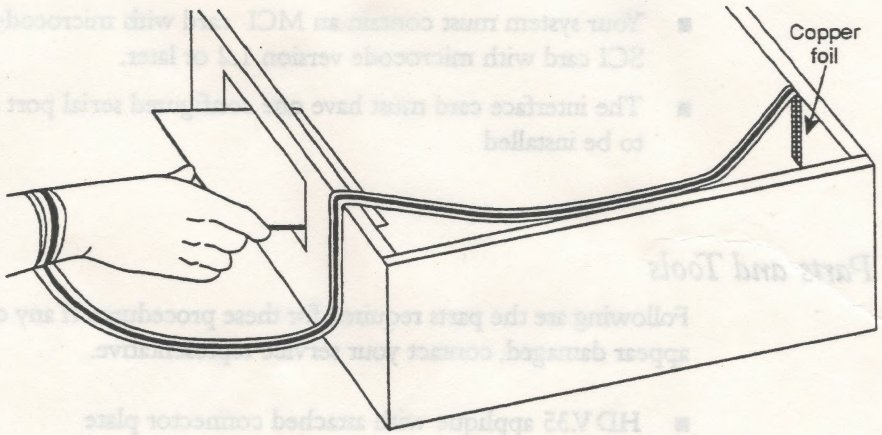

Figure 5 Placement of ESD Wrist Strap

Step 3: Use the ejectors to remove the card. Handle the card by its sides. Place the card on an antistatic surface or in a static shielding bag. To prevent further damage to the card by ESD voltages, defective cards must remain in the static shielding bag when returned for repair or replacement.

Step 4: Handling the new card by its edges only, insert it into the chassis. Avoid contact between the card and clothing. The wrist strap only protects the card from ESD voltages on the body; ESD voltages on clothing can still damage the card.

For safety, use an ohmmeter to check the ESD wrist strap to ensure that the resistor is providing proper ESD protection. The measurement should be in a range of 1 to 10 Mohms.

Warning: Before accessing the chassis interior and removing any cards, turn off power to the chassis and unplug the power cord. Use extreme caution around the chassis since potentially harmful voltages are present.

Accessing the Chassis Interior

Following are the procedures for accessing the chassis interior and the connector plates in each of the three types of chassis: A-type, M, and C. Refer to the section that applies to your chassis type.

A-Type Chassis

The A-type chassis has four large mounting plates and one large individual connection area with space for six individual mounting plates. The console port connector uses one of the individual mounting plate spaces leaving five plates available for other applique attachments. The large mounting plates are used for multiple or large applique attachments. When ordering replacements from the factory, specify the mode of the appliques and the mounting plate size that you require (see Table 1).

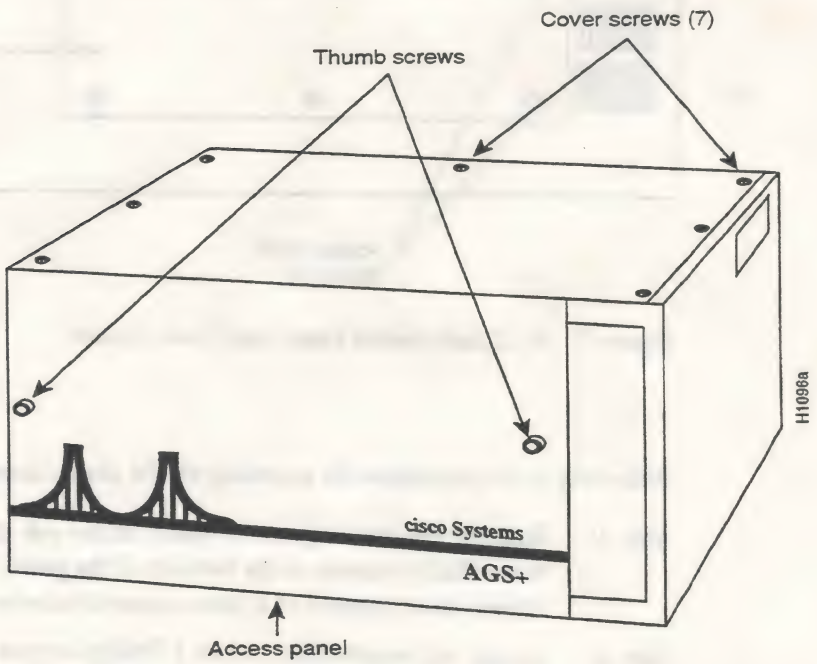

Figure 6 A-type Chassis Front Access Panel and Cover Screws

Following is the procedure for accessing the A-type chassis interior:

Step 1: On the front access panel, loosen (but do not attempt to remove) the two thumb fasteners and pull the panel off the chassis (see Figure 6).

Step 2: Locate and remove the seven screws securing the top panel to the chassis; three are located on each of the two sides of the cover, and one at the back.

Step 3: Lift the top cover up and away from the chassis.

Proceed to "Installing the HD V.35 Applique."

M Chassis

The M chassis has two small mounting plates and one individual connection area with space for four appliques. The console port connector uses one of the individual mounting plates leaving three plates available for other applique attachments. The small mounting plates are used for multiple or large applique attachments. When ordering replacements from the factory, specify the mode of the appliques and the mounting plate size that you require (see Table 1).

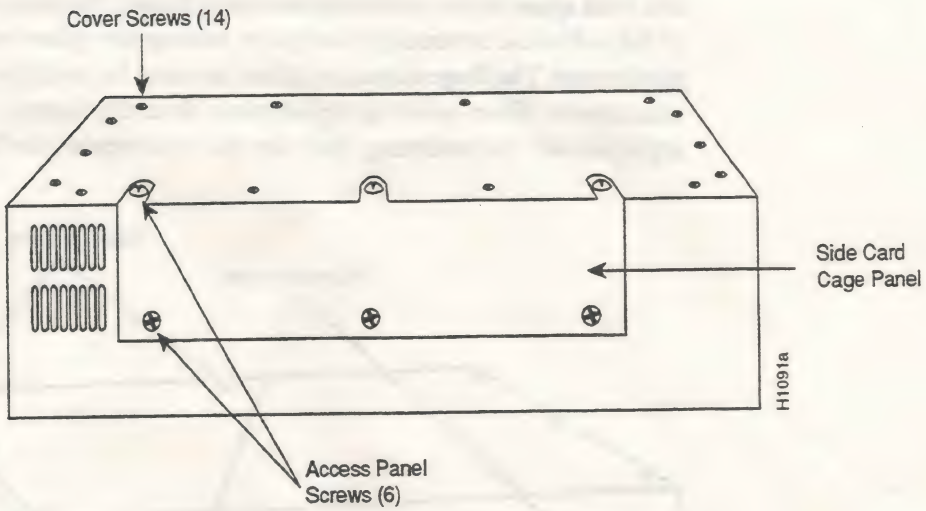

Figure 7 M Chassis Access Panel and Cover Screws

Following is the procedure for accessing the M chassis interior:

Step 1: Remove the card cage access panel on the side of the chassis. First loosen the three Phillips screws at the bottom of the panel, then turn the top flat-blade screws three quarters of a turn counterclockwise (see Figure 7).

Step 2: Locate and remove the 14 No. 1 Phillips screws that secure the top panel to the chassis.

Step 3: Lift the cover up and away from the chassis.

Proceed to "Installing the HD V.35 Applique."

C Chassis

The C chassis has one small plate and one individual connection area with space for four appliques. The console port connector uses one of the individual plates, which leaves three plates available for Ethernet or RS-232 appliques. The small mounting plate is used for multiple or large (RS-449) appliques. When ordering replacements from the factory, specify the mode of the applique and mounting plate size that you require (see Table 1).

You must remove the cover to gain access to the system card cage. The top cover on a C chassis envelopes the chassis and is secured by ten No. 2 Phillips screws: six on the bottom and two on each side.

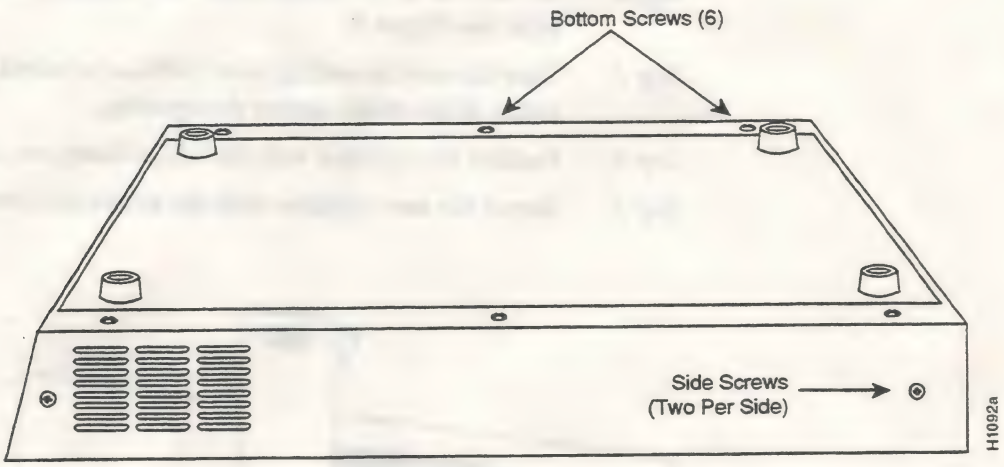

Figure 8 C Chassis Cover — Bottom View

Following is the procedure for accessing the C chassis interior:

Step 1: Disconnect all power and interface cables from the rear of the chassis.

Step 2: Remove the two screws on each of the two sides of the cover (see Figure 8).

Step 3: Turn the system upside down and remove the six screws along each bottom edge.

Step 4: Turn the chassis over so the bottom is again facing down.

Step 5: Use a flat-blade screwdriver to gently lift the back end of the chassis away from the cover.

Step 6: To remove the cover, pull it from the front of the chassis. The cover fits the chassis quite tightly so some resistance may be met.

Proceed to "Installing the HD V.35 Applique."

Installing the HD V.35 Applique

Following is the procedure for installing the HD V.35 applique and cable:

Note: Before performing these steps, refer to Figure 2 which shows the location of connector plates on the chassis.

Step 1: Turn off power to the chassis and unplug the power cord.

Step 2: On the rear of the chassis, remove the appropriate blank plate. Set the screws aside (see Figure 9).

Step 3: Place the new mounting plate (with the attached HD V.35 applique) on the inside of the chassis against the opening.

Step 4: Position the applique with the LEDs facing out and below the connector.

Step 5: Secure the new applique with the screws you removed from the blank plate.

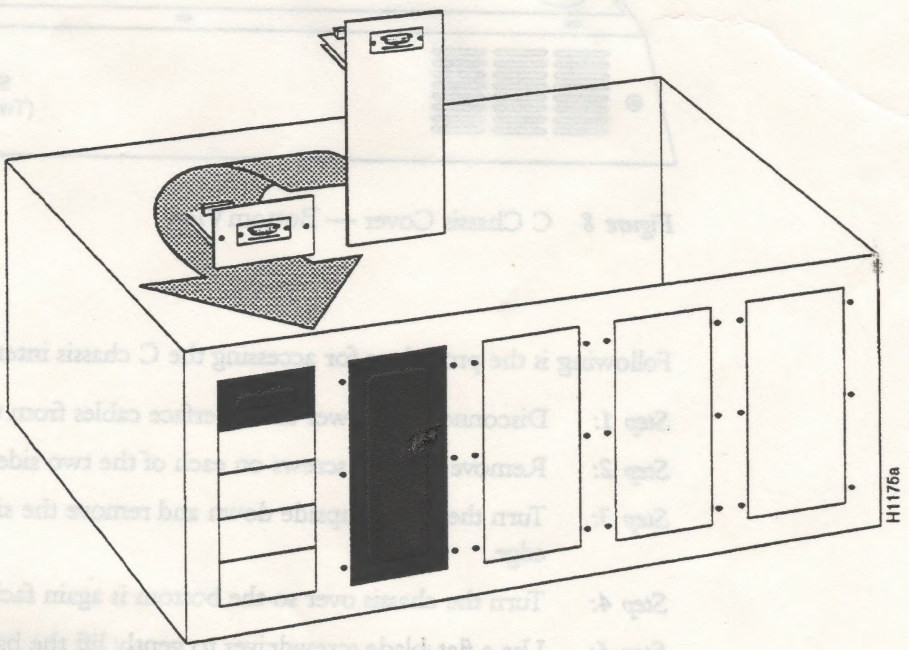

Figure 9 Typical Installation—A-Type Chassis

Step 6: Connect an internal ribbon cable between the 26-pin connector on the applique and the appropriate serial connector on the SCI or MCI card in the chassis card cage. Route the cable under the system card cage and up to the card in the front of the chassis. The connector is keyed to prevent improper insertion at the interface card. Do not stress the cable at the applique or serial connector.

Caution: If installing more than one applique, use the 26-pin ribbon cable connector with the color coded edge as *serial 0* (N) and the second connector as *serial 1* (N+1).

Step 7: Attach the smaller HD end of the HD V.35 cable to the HD V.35 connector on the applique and the larger end (standard V.35 male or female) to your network segment.

Testing the Installation

Following is the procedure for testing the HD V.35 applique installation:

Caution: To prevent the chassis overheating during the following steps, apply power only long enough to check for proper operation.

Step 1: Connect the power cable and turn on the power to the chassis.

Step 2: For DCE only—Set the clockrate (after system boot) for the new interface using the **configure terminal** command and set the desired clockrate using the **clockrate** command (see "Changing the Clock Source and Rates (DCE Mode Only)").

Note: If the new applique is set for DCE mode, the red DCE LED lights and remains lit during operation (see Table 2).

Step 3: After the system boots up, verify the correct mode of the newly installed interface by using the **show controller mci** and **show interface serial** *number* commands (where *number* refers to the interface number of the newly installed serial port and applique).

Following is sample output of these commands (*serial 0* and DTE mode are used in the examples):

```
Router#show controller mci
MCI 0, controller type 1.1, microcode version 1.8
  128 Kbytes of main memory, 4 Kbytes cache memory
22 system TX buffers, largest buffer size 1520
  Restarts: 0 line down, 0 hung output, 0 controller error
  Interface 0 is Serial0, electrical interface is V.35 DTE
```

In this example, the important information is contained in the last line, which indicates the type and mode of serial interface attached.

Note: Much more information (than what is shown in these examples) will be printed to the screen, but has been excluded for clarity.

```
Router#show interface serial 0
Serial 0 is up, line protocol is up
  Hardware is MCI Serial
```

In this example, the important information is in the first line, which indicates the state of the newly installed serial interface; the interface should be up if everything is connected and configured correctly.

Note: An error condition exists if no LED indicators light at power-up or after initialization, or if the newly installed interface is not seen by the system. If this happens, check that all cards and cables are firmly seated. If a second power-up attempt fails, contact your service representative.

Error Conditions

Following are examples of possible error conditions and symptoms:

- If the applique is set for DCE, but the clockrate is not set, the clock and data LEDs will not light.
- If the applique is set for DTE, but the MCI or SCI jumpers are set for DCE (or a DCE cable is used), the LEDs may appear as they should, but the interface will stay down.
- If the external or internal cable is not connected, the interface will be up, but line protocol will be down.

Step 1: When the installation check is successful, all LEDs on the applique should be on except the loopback LED (unless loopback has been selected through software) and the DCE LED if DTE mode is selected.

Step 2: Turn off the power and unplug the chassis.

Step 3: Replace and secure the chassis cover.

Step 4: Affix the new serial interface labels (Serial 0 and so forth) below the appropriate connector on the rear of the chassis and to the internal interface ribbon cables.

Note: If it becomes necessary to reconfigure a single applique after it is installed power down the chassis, attach ESD protection, remove the chassis cover, and use a 3/16" nut driver to remove the strain-relief nuts that secure the individual applique to the mounting plate. With these nuts removed, the applique may be pulled out of the mounting plate, reconfigured, and reattached without having to remove the entire rear plate assembly or disconnect any interior cables.

The system is ready to be installed in the network.

This document is to be used in conjunction with the appropriate *Configuration and Reference* publication.

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